

DOCUMENT-IDENTIFIER: US 20020100554 A1

TITLE: Substrate processing using a member comprising an oxide of a group IIIB metal

----- KWIC -----

Abstract Paragraph - ABTX (1):

An erosion resistant member that may be used in the processing of a substrate in a plasma of a processing gas, comprises at least a portion that may be exposed to the plasma of the processing gas and that contains more than about 3% by weight of an oxide of a Group IIIB metal. The portion may also further contain a ceramic compound selected from silicon carbide, silicon nitride, boron carbide, boron nitride, aluminum nitride, aluminum oxide, and mixtures thereof.

Detail Description Paragraph - DETX (4):

[0041] The dielectric member 20 and the process kit 14 are manufactured of a ceramic material. When the wafer substrate 13 is processed, ceramic dielectric member 20 and ceramic process kit 14 erodes, causing generation of contaminating particulates. Erosion of the dielectric member 20 and the process kit 14 is particularly profound when the wafer substrate 13 is processed by etching in a high density plasma of an etchant gas, especially when the etchant gas is a halogen-containing etchant gas, such as Cl.sub.2 and BCl.sub.3. High density plasma may be defined as a plasma of an etchant gas having an ion density greater than about  $10^{9.9}/\text{cm}^{3.3}$ , preferably greater than about  $10^{11.1}/\text{cm}^{3.3}$ . The source of the high density plasma may be any suitable high density source, such as electron cyclotron resonance (ECR), helicon resonance or inductively coupled plasma (ICP)-type sources.

Detail Description Paragraph - DETX (6):

[0043] The ceramic compound for the ceramic composition is a compound that is typically electrically insulating and the crystallinity of which varies among amorphous, glassy, microcrystalline, and singly crystalline, dependent on material and its processing. The ceramic compound is preferably an essentially non-porous material. It is a good electrical insulator, and because it can be made in a relatively pure form (approximately 99% by weight or better) it has a low degree of chemical reactivity in the plasma environment. The ceramic compound may be an suitable ceramic compound that may combine with the oxide of Group IIIB metal to form a highly erosion-resistive ceramic structure,

especially when processing power is passing through the dielectric member 20 during etching of a substrate (e.g. wafer substrate 13) in a high density **plasma** (e.g. high density **plasma** 94) of a processing gas. The ceramic compound is preferably selected from the group consisting of silicon carbide (SiC), silicon nitride (Si.sub.3N.sub.4), boron carbide (B.sub.4C), boron nitride (BN), aluminum nitride (AlN), aluminum oxide (Al.sub.2O.sub.3) and mixtures thereof. More preferably, the ceramic compound comprises aluminum oxide (Al.sub.2O.sub.3), especially since aluminum oxide is relatively inexpensive and readily available.

Claims Text - CLTX (25):

24. A **plasma** reactor according to claim 19 wherein the portion of the member further comprises a ceramic compound selected from silicon carbide, silicon nitride, boron carbide, boron nitride, aluminum nitride, aluminum oxide, and mixtures thereof.